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EXAMINER

THOMPSON, JAMES A

ART UNIT

PAPER NUMBER

2624

DATE MAILED: 04/20/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/939,932

Applicant(s)

RUSSELL, GARY

Examiner

James A Thompson

Art Unit

2624

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 27 Aug. 2001, 03 Jan. 2003, 11 June 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-28,30,31,33-37 and 39-76 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-28,30,31,33-37 and 39-76 is/are rejected.
- 7) ☒ Claim(s) 6,26,42,44 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 27 August 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

Art Unit: 2624

DETAILED ACTION***Claim Objections***

1. Applicant is advised that should claim 2 be found allowable, claims 6 and 42 will be objected to under 37 CFR 1.75 as being a substantial duplicate thereof. When two claims in an application are duplicates or else are so close in content that they both cover the same thing, despite a slight difference in wording, it is proper after allowing one claim to object to the other as being a substantial duplicate of the allowed claim. See MPEP § 706.03(k).

2. Applicant is advised that should claim 18 be found allowable, claim 44 will be objected to under 37 CFR 1.75 as being a substantial duplicate thereof. When two claims in an application are duplicates or else are so close in content that they both cover the same thing, despite a slight difference in wording, it is proper after allowing one claim to object to the other as being a substantial duplicate of the allowed claim. See MPEP § 706.03(k).

3. Claim 26 is objected to because of the following informalities:

The equation given in claim 26 is $fold(x) = [x] - \frac{1}{3} - \frac{1}{3} - \frac{1}{3} * 3$, which simplifies to $fold(x) = 3 * x - 3$ and is not the same equation given in the specification. The equation disclosed in the specification is $fold(x) = ||x| - \frac{1}{3}| - \frac{1}{3}| - \frac{1}{3} * 3$, which uses the absolute value signs. Since this is clearly an unintentional error, Examiner will use the corrected equation when examining claim 26 over the prior art. Appropriate correction is required.

Art Unit: 2624

Claim Rejections - 35 USC § 112

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claim 59 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 59 recites "[t]he apparatus of claim 38". However, claim 38 has been cancelled. Therefore, there is no antecedent basis for "[t]he apparatus of claim 38".

For the purpose of examining claim 59 over the prior art, Examiner will assume that claim 59 depends from claim 58, since claim 58 is also an apparatus and does not yet comprise the limitations recited in claim 59.

6. Claim 72 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 72 recites "said recording medium *further includes* at least one medium selected from a group consisting of: ..." [emphasis added]. If the recording medium is one particular type of recording medium, which inherently said recording medium must be, then said recording medium cannot further include a different type of recording medium. The claim language is inherently contradictory. For the purpose of examining the claims with respect to the prior art, Examiner interprets "said recording medium further includes at least one medium selected

Art Unit: 2624

from a group" to mean "said recording medium is one medium selected from a group".

Claim Rejections - 35 USC § 102

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless -

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

8. Claims 1, 5, 8, 12, 27-28, 46-47 and 65 are rejected under 35 U.S.C. 102(b) as being anticipated by Harrington (US Patent 5,631,748).

Regarding claims 1 and 27: Harrington discloses a program product (column 8, lines 35-38 of Harrington) comprising a program configured to place a first and a second dot within a halftone cell (figure 4B and column 5, lines 38-43 of Harrington), wherein at least a portion of said first dot overlaps at least a portion of said second dot (figure 4B("CY" and "MC") and column 5, lines 46-49 of Harrington); and a signal bearing medium bearing said program (column 8, lines 35-38 of Harrington). As can clearly be seen in figure 4B of Harrington, two locations in the halftone cell have overlapping dots (figure 4B("CY" and "MC") and column 5, lines 38-46 of Harrington), one location overlapping a cyan and a yellow dot (figure 4B("CY") of Harrington) and one location overlapping a magenta and a cyan dot (figure 4B("MC") of Harrington).

Regarding claim 8: Harrington discloses placing a first and a second dot within a halftone cell, wherein said first and second halftone dots are dissimilar (figure 4B and column 5,

Art Unit: 2624

lines 46-49 of Harrington). An example of two dots within the halftone cell shown in figure 4B of Harrington are the cyan and yellow dot shown in figure 4B("CY") of Harrington. Since one dot is cyan and the other dot is yellow, then said first and second halftone dots are clearly dissimilar.

Regarding claims 5 and 12: Harrington teaches differing tonal characteristics of said first and second dots (figure 4B ("CY") of Harrington). As is well-known in the art, cyan dots and magenta dots have different tonal characteristics since yellow dots are generally lighter for the same intensity value than cyan dots.

Regarding claim 28: Harrington discloses that said signal bearing medium includes a recordable medium (column 8, lines 35-38 of Harrington). In order for software to be usable by a computer or workstation, software must be embodied on some form of recordable medium. Otherwise, it is not possible for the computer or workstation to read and execute the instructions in said software.

Regarding claim 46: Harrington discloses a printing system (figure 1 of Harrington) comprising a scanning circuit (figure 1 (10) of Harrington) for reading image data from a source (column 4, lines 21-24 of Harrington); a processor in communication with said scanning circuit (figure 1(20) of Harrington), wherein said processor receives and processes the image data to generate an image file (column 4, lines 33-38 of Harrington); and an image setter in communication with said processor (figure 1(30) of Harrington), wherein said image setter receives said image file from said processor and produces a plurality of dots on a recording medium (column 4, lines 40-46 of Harrington), said plurality of dots including a first and a second dot within a

Art Unit: 2624

halftone cell, wherein at least a portion of said first dot overlaps at least a portion of said second dot (figure 4B("CY" and "MC") and column 5, lines 46-49 of Harrington). The resultant colorant values must be stored in some form of an image file since the colorant values are then halftoned at the halftoning processor and used to drive the printer (column 4, lines 38-40 of Harrington). Further, as can clearly be seen in figure 4B of Harrington, two locations in the halftone cell have overlapping dots (figure 4B("CY" and "MC") and column 5, lines 38-46 of Harrington), one location overlapping a cyan and a yellow dot (figure 4B("CY") of Harrington) and one location overlapping a magenta and a cyan dot (figure 4B("MC") of Harrington).

Regarding claim 47: Harrington discloses a printing system (figure 1 of Harrington) comprising a scanning circuit (figure 1 (10) of Harrington) for reading image data from a source (column 4, lines 21-24 of Harrington); a processor in communication with said scanning circuit (figure 1(20) of Harrington), wherein said processor receives and processes the image data to generate an image file (column 4, lines 33-38 of Harrington); and an image setter in communication with said processor (figure 1(30) of Harrington), wherein said image setter receives said image file from said processor and produces a plurality of dots on a recording medium (column 4, lines 40-46 of Harrington), said plurality of dots including a first and a second dot within a halftone cell, wherein said first and second dots are dissimilar (figure 4B and column 5, lines 46-49 of Harrington). The resultant colorant values must be stored in some form of an image file since the colorant values are then halftoned at the halftoning processor and used to drive the printer (column 4,

Art Unit: 2624

lines 38-40 of Harrington). Further, an example of two dots within the halftone cell shown in figure 4B of Harrington are the cyan and yellow dot shown in figure 4B("CY") of Harrington. Since one dot is cyan and the other dot is yellow, then said first and second halftone dots are clearly dissimilar.

Regarding claim 65: Harrington discloses producing a halftone screen (column 5, lines 36-38 of Harrington) and a threshold array (column 5, lines 38-43 of Harrington).

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. Claims 2-3, 6, 9-10, 30-31 and 42 are rejected under 35 U.S.C. 103(a) as being unpatentable over Harrington (US Patent 5,631,748) in view of Curry (US Patent 5,696,604).

Regarding claims 2, 6, 9 and 42: Harrington does not disclose expressly differing frequencies of said first and second dots.

Curry discloses differing the dot frequencies for halftone dots (figures 5a-5d and column 4, lines 25-29 of Curry). The dot area corresponds to dot frequency since, for a particular area and shape, a certain frequency is generated for the halftone dot.

Art Unit: 2624

Harrington and Curry are combinable because they are from the same field of endeavor, namely halftone image processing. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to specifically have modifiable and thus differing dot frequencies, as taught by Curry, for the first and second dots taught by Harrington. The motivation for doing so would have been to more accurately adjust a halftone printing device, and thus automatically create more accurate halftone patterns (column 1, lines 55-63 of Curry). Therefore, it would have been obvious to combine Curry with Harrington to obtain the invention as specified in claims 2, 6, 9 and 42.

Regarding claims 3 and 10: Harrington does not disclose expressly differing shapes of said first and second dots.

Curry discloses differing dot shapes (column 5, lines 12-17 of Curry).

Harrington and Curry are combinable because they are from the same field of endeavor, namely halftone image processing. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to specifically have modifiable and thus differing dot shapes, as taught by Curry, for the first and second dots taught by Harrington. The motivation for doing so would have been to more accurately adjust a halftone printing device, and thus automatically create more accurate halftone patterns (column 1, lines 55-63 of Curry). Therefore, it would have been obvious to combine Curry with Harrington to obtain the invention as specified in claims 3 and 10.

Regarding claim 30: Harrington discloses a program product (column 8, lines 35-38 of Harrington) comprising a program

Art Unit: 2624

configured to place a first and a second dot within a halftone cell (figure 4B and column 5, lines 38-43 of Harrington), wherein said first and second halftone dots are dissimilar in at least one characteristic selected from a group consisting of: shape, tone and orientation (figure 4B and column 5, lines 46-49 of Harrington); and a signal bearing medium bearing said program (column 8, lines 35-38 of Harrington). An example of two dots within the halftone cell shown in figure 4B of Harrington are the cyan and yellow dot shown in figure 4B("CY") of Harrington. As is well-known in the art, cyan dots and yellow dots are dissimilar in tone since yellow dots are always lighter in color and less noticeable by human beings. Another example of dissimilar dots is shown in figure 4B("MC") of Harrington, which shows a magenta dot and a cyan dot in the same halftone cell. The magenta dot and cyan dot are dissimilar in terms of orientation, as shown in figure 4A of Harrington. The cyan dots project at a different angle than the magenta dots (figure 4A of Harrington), thus showing that the magenta dots and cyan dots have different orientations.

Harrington does not disclose expressly that said first and second dots can further be dissimilar in frequency and shape; and that said dissimilar characteristic is specifically selected.

Curry discloses specifically selecting dot characteristics including dot frequency (figures 5a-5d and column 4, lines 25-29 of Curry) and dot shape (column 5, lines 12-17 of Curry). The dot area corresponds to dot frequency since, for a particular area and shape, a certain frequency is generated for the halftone dot screen.

Art Unit: 2624

Harrington and Curry are combinable because they are from the same field of endeavor, namely halftone image processing. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to include dot frequency and dot shape selection, as taught by Curry, as one of the dissimilarities in the group of possible dissimilarities between said first and second dots. Dot properties of said first and second dots, and thus the dissimilarities of said first and second dots, taught by Harrington would be specifically selected, as taught by Curry. The motivation for doing so would have been to more accurately adjust a halftone printing device, and thus automatically create more accurate halftone patterns (column 1, lines 55-63 of Curry). Therefore, it would have been obvious to combine Curry with Harrington to obtain the invention as specified in claim 30.

Regarding claim 31: Harrington discloses that said signal bearing medium includes a at least one of a recordable medium and a transmission-type medium (column 8, lines 35-38 of Harrington). In order for software to be usable by a computer or workstation, software must be embodied on some form of recordable medium. Otherwise, it is not possible for the computer or workstation to read and execute the instructions in said software. Further, software must be transmittable from some type of physical storage drive to the CPU and RAM of the computer or workstation. Therefore, said signal bearing medium must inherently comprise some form of transmission type medium.

11. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Harrington (US Patent 5,631,748) in view of Curry (US Patent 5,696,604) and Broddin (US Patent 5,982,989).

Art Unit: 2624

Regarding claim 4: Harrington does not disclose expressly selecting said shapes of said first and second dots from a group consisting of: elliptical, triangular, circular, rectangular, diamond and linear shapes.

Curry discloses selecting dot shapes (figure 6 and column 5, lines 41-43 of Curry) from a group comprising circular, rectangular, diamond (column 5, lines 12-16 of Curry) and triangular shapes (column 1, lines 50-51 of Curry).

Harrington and Curry are combinable because they are from the same field of endeavor, namely halftone image processing. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to be able to choose a dot shape from a group comprising circular, rectangular, diamond and triangular shapes, as taught by Curry. The motivation for doing so would have been to more accurately adjust a halftone printing device, and thus automatically create more accurate halftone patterns (column 1, lines 55-63 of Curry). Therefore, it would have been obvious to combine Curry with Harrington.

Harrington in view of Curry does not disclose expressly that said group also contains elliptical and linear shapes.

Broddin discloses that said group comprises circular, rectangular (square is a type of rectangular), elliptical and linear shapes (column 4, lines 27-35 of Broddin).

Harrington in view of Curry is combinable with Broddin because they are from the same field of endeavor, namely halftone image processing. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to include the elliptical and linear halftone dot shapes taught by Broddin into the group of halftone dot shapes that can be selected from, as taught by Harrington in view of Curry. Said

Art Unit: 2624

group would then consist of elliptical, triangular, circular, rectangular, diamond and linear shapes. The suggestion for doing so would have been that the halftone dot shapes taught by Broddin are simply more halftone dot shapes that are possible for one of ordinary skill in the art to use when designing a halftone screen. Therefore, it would have been obvious to combine Broddin with Harrington in view of Curry to obtain the invention as specified in claim 4.

12. Claim 66 is rejected under 35 U.S.C. 103(a) as being unpatentable over Harrington (US Patent 5,631,748) in view of Kemmochi (US Patent 5,627,919).

Regarding claim 66: Harrington does not disclose expressly generating a cross shape.

Kemmochi discloses generating a cross dot shape (figure 1A; figure 5; column 4, lines 9-15 and column 6, lines 15-26 of Kemmochi).

Harrington and Kemmochi are combinable because they are from the same field of endeavor, namely halftone image processing. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to include generating the cross shape, taught by Kemmochi, as part of the step of overlapping taught by Harrington. The suggestion for doing so would have been that the cross halftone dot shape taught by Kemmochi is simply one halftone dot shape that is possible for one of ordinary skill in the art to use when designing a halftone screen. Therefore, it would have been obvious to combine Kemmochi with Harrington to obtain the invention as specified in claim 66.

Art Unit: 2624

13. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Harrington (US Patent 5,631,748) in view of Curry (US Patent 5,696,604), Broddin (US Patent 5,982,989), and Kemmochi (US Patent 5,627,919).

Regarding claim 11: Harrington does not disclose expressly selecting said shapes of said first and second dots from a group consisting of: elliptical, cross, triangular, circular, rectangular, diamond and linear shapes.

Curry discloses selecting dot shapes (figure 6 and column 5, lines 41-43 of Curry) from a group comprising circular, rectangular, diamond (column 5, lines 12-16 of Curry) and triangular shapes (column 1, lines 50-51 of Curry).

Harrington and Curry are combinable because they are from the same field of endeavor, namely halftone image processing. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to be able to choose a dot shape from a group comprising circular, rectangular, diamond and triangular shapes, as taught by Curry. The motivation for doing so would have been to more accurately adjust a halftone printing device, and thus automatically create more accurate halftone patterns (column 1, lines 55-63 of Curry). Therefore, it would have been obvious to combine Curry with Harrington.

Harrington in view of Curry does not disclose expressly that said group also contains elliptical, cross and linear shapes.

Broddin discloses that said group comprises circular, rectangular (square is a type of rectangular), elliptical and linear shapes (column 4, lines 27-35 of Broddin).

Harrington in view of Curry is combinable with Broddin because they are from the same field of endeavor, namely

Art Unit: 2624

halftone image processing. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to include the elliptical and linear halftone dot shapes taught by Broddin into the group of halftone dot shapes that can be selected from, as taught by Harrington in view of Curry. Said group would then consist of elliptical, triangular, circular, rectangular, diamond and linear shapes. The suggestion for doing so would have been that the halftone dot shapes taught by Broddin are simply more halftone dot shapes that are possible for one of ordinary skill in the art to use when designing a halftone screen. Therefore, it would have been obvious to combine Broddin with Harrington in view of Curry.

Harrington in view of Curry and Broddin does not disclose expressly that said group includes a cross shape.

Kemmochi discloses a cross dot shape (figure 1A; figure 5; column 4, lines 9-15 and column 6, lines 15-26 of Kemmochi).

Harrington in view of Curry and Broddin is combinable with Kemmochi because they are from the same field of endeavor, namely halftone image processing. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to include the cross shape, taught by Kemmochi, into the group of halftone dot shapes that can be selected from, as taught by Harrington in view of Curry and Broddin. Said group would then consist of elliptical, cross, triangular, circular, rectangular, diamond and linear shapes. The suggestion for doing so would have been that the cross halftone dot shape taught by Kemmochi is simply one more halftone dot shape that are possible for one of ordinary skill in the art to use when designing a halftone screen. Therefore, it would have been

Art Unit: 2624

obvious to combine Kemmochi with Harrington in view of Curry and Broddin to obtain the invention as specified in claim 11.

14. Claims 7, 13-14, 17, 19-20, 24-25 and 73-74 are rejected under 35 U.S.C. 103(a) as being unpatentable over Harrington (US Patent 5,631,748) in view of Delabastita (US Patent 5,828,463).

Regarding claim 14: Harrington discloses a first and second dot within a halftone cell of a halftone screen (figure 4B and column 5, lines 38-43 of Harrington), wherein at least a portion of said first dot overlaps at least a portion of said second dot (figure 4B("CY" and "MC") and column 5, lines 46-49 of Harrington). As can clearly be seen in figure 4B of Harrington, two locations in the halftone cell have overlapping dots (figure 4B("CY" and "MC") and column 5, lines 38-46 of Harrington), one location overlapping a cyan and a yellow dot (figure 4B("CY") of Harrington) and one location overlapping a magenta and a cyan dot (figure 4B("MC") of Harrington).

Harrington does not disclose expressly that said first and second dot within a halftone cell of a halftone screen are embodied on a printing plate.

Delabastita discloses using a printing plate to form a halftone screen for printing a halftone image (column 6, lines 49-57 of Delabastita).

Harrington and Delabastita are combinable because they are from the same field of endeavor, namely halftone image processing. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to embody the halftone screen containing the halftone cell within which is said first and second dots taught by Harrington, on a printing plate, as taught by Delabastita. The suggestion for doing so

Art Unit: 2624

would have been that a printing plate is one of the many old and well-known possible means available to one of ordinary skill in the art on which to form a halftone screen. Therefore, it would have been obvious to combine Delabastita with Harrington to obtain the invention as specified in claim 14.

Regarding claim 20: Harrington discloses a first and second dot within a halftone cell of a halftone screen (figure 4B and column 5, lines 38-43 of Harrington), wherein said first and second dots are dissimilar (figure 4B and column 5, lines 46-49 of Harrington). An example of two dots within the halftone cell shown in figure 4B of Harrington are the cyan and yellow dot shown in figure 4B("CY") of Harrington. Since one dot is cyan and the other dot is yellow, then said first and second halftone dots are clearly dissimilar.

Harrington does not disclose expressly that said first and second dot within a halftone cell of a halftone screen are embodied on a printing plate.

Delabastita discloses using a printing plate to form a halftone screen for printing a halftone image (column 6, lines 49-57 of Delabastita).

Harrington and Delabastita are combinable because they are from the same field of endeavor, namely halftone image processing. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to embody the halftone screen containing the halftone cell within which is said first and second dots taught by Harrington, on a printing plate, as taught by Delabastita. The suggestion for doing so would have been that a printing plate is one of the many old and well-known possible means available to one of ordinary skill in the art on which to form a halftone screen. Therefore, it would

Art Unit: 2624

have been obvious to combine Delabastita with Harrington to obtain the invention as specified in claim 20.

Regarding claims 17 and 24: Harrington teaches that each of said first and second dots has a different tonal characteristic (figure 4B ("CY") of Harrington). As is well-known in the art, cyan dots and magenta dots have different tonal characteristics since yellow dots are generally lighter for the same intensity value than cyan dots.

Regarding claims 7, 13, 19 and 25: Since Harrington teaches using different color dots which are propagated at different angles (figures 4a-4b of Harrington), and it would be reasonable to assume that said first dot and said second dot are oriented at different angles. However, Harrington does not disclose expressly orienting a first angle of said first dot differently than a second angle of said second dot relative to a first side of said halftone cell.

Delabastita discloses orienting a first angle of a first dot differently than a second angle of a second dot relative to a first side of a halftone cell (figures 1a-1f and column 2, lines 15-20 of Delabastita). The carrier grids have different halftone dot orientations (column 2, lines 15-20 of Delabastita), as clearly do the halftone dots in figures 1c and 1f of Delabastita.

Harrington and Delabastita are combinable because they are from the same field of endeavor, namely halftone image processing. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to orient said first and second dots taught by Harrington at different angles, as taught by Delabastita. The suggestion for doing so would have been that, as is well-known in the art, different color

dots are oriented at different angles. Therefore, it would have been obvious to combine Delabastita with Harrington to obtain the invention as specified in claims 7, 13, 19 and 25.

Regarding claims 73 and 74: Harrington discloses producing a halftone screen (column 5, lines 36-38 of Harrington) and a threshold array (column 5, lines 38-43 of Harrington). As discussed in the arguments regarding claim 14, which are incorporated herein, said halftone screen, and thus said threshold array, is associated with the printing plate taught by Delabastita.

15. Claims 15, 18, 21-22 and 44 are rejected under 35 U.S.C. 103(a) as being unpatentable over Harrington (US Patent 5,631,748) in view of Delabastita (US Patent 5,828,463) and Curry (US Patent 5,696,604).

Regarding claims 18, 21 and 44: Harrington in view of Delabastita does not disclose expressly that each of said first and second dots has a different frequency.

Curry discloses different the dot frequencies for halftone dots (figures 5a-5d and column 4, lines 25-29 of Curry). The dot area corresponds to dot frequency since, for a particular area and shape, a certain frequency is generated for the halftone dot.

Harrington in view of Delabastita is combinable with Curry because they are from the same field of endeavor, namely halftone image processing. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to specifically have modifiable and thus different dot frequencies, as taught by Curry, for the first and second dots taught by Harrington. The motivation for doing so would have

Art Unit: 2624

been to more accurately adjust a halftone printing device, and thus automatically create more accurate halftone patterns (column 1, lines 55-63 of Curry). Therefore, it would have been obvious to combine Curry with Harrington in view of Delabastita to obtain the invention as specified in claims 18, 21 and 44.

Regarding claims 15 and 22: Harrington in view of Delabastita does not disclose expressly that each of said first and second dots has a different shape.

Curry discloses different dot shapes for halftone dots (column 5, lines 12-17 of Curry).

Harrington in view of Delabastita is combinable with Curry because they are from the same field of endeavor, namely halftone image processing. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to specifically have modifiable and thus differing dot shapes, as taught by Curry, for the first and second dots taught by Harrington. The motivation for doing so would have been to more accurately adjust a halftone printing device, and thus automatically create more accurate halftone patterns (column 1, lines 55-63 of Curry). Therefore, it would have been obvious to combine Curry with Harrington in view of Delabastita to obtain the invention as specified in claims 15 and 22.

16. Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Harrington (US Patent 5,631,748) in view of Delabastita (US Patent 5,828,463), Curry (US Patent 5,696,604), Broddin (US Patent 5,982,989), and Kemmochi (US Patent 5,627,919).

Regarding claim 16: Harrington in view of Delabastita does not disclose expressly that said different shape is selected

Art Unit: 2624

from a group consisting of: elliptical, triangular, circular, cross, rectangular, diamond and linear shapes.

Curry discloses selecting dot shapes (figure 6 and column 5, lines 41-43 of Curry) from a group comprising circular, rectangular, diamond (column 5, lines 12-16 of Curry) and triangular shapes (column 1, lines 50-51 of Curry).

Harrington in view of Delabastita is combinable with Curry because they are from the same field of endeavor, namely halftone image processing. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to be able to choose a dot shape from a group comprising circular, rectangular, diamond and triangular shapes, as taught by Curry. The motivation for doing so would have been to more accurately adjust a halftone printing device, and thus automatically create more accurate halftone patterns (column 1, lines 55-63 of Curry). Therefore, it would have been obvious to combine Curry with Harrington.

Harrington in view of Delabastita and Curry does not disclose expressly that said group also contains elliptical, cross and linear shapes.

Broddin discloses that said group comprises circular, rectangular (square is a type of rectangular), elliptical and linear shapes (column 4, lines 27-35 of Broddin).

Harrington in view of Delabastita and Curry is combinable with Broddin because they are from the same field of endeavor, namely halftone image processing. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to include the elliptical and linear halftone dot shapes taught by Broddin into the group of halftone dot shapes that can be selected from, as taught by Harrington in view of Delabastita

Art Unit: 2624

and Curry. Said group would then consist of elliptical, triangular, circular, rectangular, diamond and linear shapes. The suggestion for doing so would have been that the halftone dot shapes taught by Broddin are simply more halftone dot shapes that are possible for one of ordinary skill in the art to use when designing a halftone screen. Therefore, it would have been obvious to combine Broddin with Harrington in view of Delabastita and Curry.

Harrington in view of Delabastita, Curry and Broddin does not disclose expressly that said group includes a cross shape.

Kemmochi discloses a cross dot shape (figure 1A; figure 5; column 4, lines 9-15 and column 6, lines 15-26 of Kemmochi).

Harrington in view of Delabastita, Curry and Broddin is combinable with Kemmochi because they are from the same field of endeavor, namely halftone image processing. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to include the cross shape, taught by Kemmochi, into the group of halftone dot shapes that can be selected from, as taught by Harrington in view of Delabastita, Curry and Broddin. Said group would then consist of elliptical, triangular, rectangular, circular, cross, diamond and linear shapes. The suggestion for doing so would have been that the cross halftone dot shape taught by Kemmochi is simply one more halftone dot shape that are possible for one of ordinary skill in the art to use when designing a halftone screen. Therefore, it would have been obvious to combine Kemmochi with Harrington in view of Delabastita, Curry and Broddin to obtain the invention as specified in claim 16.

Art Unit: 2624

17. Claim 23 is rejected under 35 U.S.C. 103(a) as being unpatentable over Harrington (US Patent 5,631,748) in view of Delabastita (US Patent 5,828,463), Curry (US Patent 5,696,604), and Broddin (US Patent 5,982,989).

Regarding claim 23: Harrington in view of Delabastita does not disclose expressly that said different shape is selected from a group consisting of: elliptical, triangular, circular, rectangular, diamond and linear shapes.

Curry discloses selecting dot shapes (figure 6 and column 5, lines 41-43 of Curry) from a group comprising circular, rectangular, diamond (column 5, lines 12-16 of Curry) and triangular shapes (column 1, lines 50-51 of Curry).

Harrington in view of Delabastita is combinable with Curry because they are from the same field of endeavor, namely halftone image processing. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to be able to choose a dot shape from a group comprising circular, rectangular, diamond and triangular shapes, as taught by Curry. The motivation for doing so would have been to more accurately adjust a halftone printing device, and thus automatically create more accurate halftone patterns (column 1, lines 55-63 of Curry). Therefore, it would have been obvious to combine Curry with Harrington.

Harrington in view of Delabastita and Curry does not disclose expressly that said group also contains elliptical and linear shapes.

Broddin discloses that said group comprises circular, rectangular (square is a type of rectangular), elliptical and linear shapes (column 4, lines 27-35 of Broddin).

Art Unit: 2624

Harrington in view of Delabastita and Curry is combinable with Broddin because they are from the same field of endeavor, namely halftone image processing. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to include the elliptical and linear halftone dot shapes taught by Broddin into the group of halftone dot shapes that can be selected from, as taught by Harrington in view of Delabastita and Curry. Said group would then consist of elliptical, triangular, circular, rectangular, diamond and linear shapes. The suggestion for doing so would have been that the halftone dot shapes taught by Broddin are simply more halftone dot shapes that are possible for one of ordinary skill in the art to use when designing a halftone screen. Therefore, it would have been obvious to combine Broddin with Harrington in view of Delabastita and Curry to obtain the invention as specified in claim 23.

18. Claim 26 is rejected under 35 U.S.C. 103(a) as being unpatentable over Harrington (US Patent 5,631,748) in view of Pellar (US Patent 4,196,451).

Regarding claim 26: Harrington discloses a halftone cell derived from a threshold equation (figures 3a-3b and column 5, lines 36-43 of Harrington). In order to produce a halftone cell with threshold values, some form of threshold equation is inherent.

Harrington does not disclose expressly that a fold function of said threshold equation generates at least one dot within said halftone cell according to $fold(x) = \left\| \left\| x - \frac{1}{3} \right\| - \frac{1}{3} \right\| - \frac{1}{3} * 3$.

Art Unit: 2624

Pellar discloses a fold function (column 6, lines 17-25 of Pellar) of a threshold equation that generates at least one dot within a halftone cell (column 6, lines 33-63 of Pellar) according to $fold(x) = \left| \left| \left| x \right| - \frac{1}{3} \right| - \frac{1}{3} \right| - \frac{1}{3} \right| * 3$ (figure 5 and column 6, lines 65-68 of Pellar). The particular fold function is variable, depending upon the desired dot shape characteristics and tone reproduction curve (column 6, lines 65-68 and column 8, line 62 to column 9, line 1 of Pellar). By adjusting the ellipticity (column 8, line 62 to column 9, line 1 of Pellar) one can obtain a specific fold function to produce a particular halftone cell (figure 5 of Pellar). The specific fold function $fold(x) = \left| \left| \left| x \right| - \frac{1}{3} \right| - \frac{1}{3} \right| - \frac{1}{3} \right| * 3$ is merely a particular setting of the apparatus taught by Pellar.

Harrington and Pellar are combinable because they are from the same field of endeavor, namely halftone image processing. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to use a particular setting of the fold function taught by Pellar to obtain a particular overall halftone cell generation and dot growth, similar to the halftone cell shown in figure 5 of Pellar, but particularly using the fold equation $fold(x) = \left| \left| \left| x \right| - \frac{1}{3} \right| - \frac{1}{3} \right| - \frac{1}{3} \right| * 3$. The motivation for doing so would have been to obtain particular dot shape characteristics and tone reproduction curve desired by a user for a particular printing project (column 6, lines 65-68 of Pellar). The fold function $fold(x) = \left| \left| \left| x \right| - \frac{1}{3} \right| - \frac{1}{3} \right| - \frac{1}{3} \right| * 3$ is merely one of the many possible functions that can be generated. Therefore, it would have been obvious to combine Pellar with Harrington to obtain the invention as specified in claim 26.

Art Unit: 2624

19. Claims 43, 45, 48-49, 60-62, 64, 68-69, 71 and 75-76 are rejected under 35 U.S.C. 103(a) as being unpatentable over Harrington (US Patent 5,631,748) in view of Tai (US Patent 5,729,632).

Regarding claim 43: Harrington does not disclose expressly creating an array that includes dots having different frequencies.

Tai discloses creating an array that includes dots having different frequencies (column 9, line 63 to column 10, line 2 of Tai). Screen "1" and screen "2" each have different frequencies (column 8, lines 23-31 of Tai) and thus, in blending, create an array including dots of different frequencies.

Harrington and Tai are combinable because they are from the same field of endeavor, namely halftone image processing. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to use an array of dots having different frequencies, as taught by Tai. The motivation for doing so would have been that using different types of grayscale dot representations for specific regions (column 2, lines 46-51 of Tai) reduces the amount of image artifacts (column 2, lines 36-42 of Tai). Therefore, it would have been obvious to combine Tai with Harrington to obtain the invention as specified in claim 43.

Regarding claim 45: Harrington discloses a printing system (figure 1 of Harrington) comprising a scanning circuit (figure 1 (10) of Harrington) for reading image data from a source (column 4, lines 21-24 of Harrington); a processor in communication with said scanning circuit (figure 1(20) of Harrington), wherein said processor receives and processes the image data to generate an image file (column 4, lines 33-38 of Harrington); and an image

Art Unit: 2624

setter in communication with said processor (figure 1(30) of Harrington), wherein said image setter receives said image file from said processor and produces a plurality of dots on a recording medium (column 4, lines 40-46 of Harrington). The resultant colorant values must be stored in some form of an image file since the colorant values are then halftoned at the halftoning processor and used to drive the printer (column 4, lines 38-40 of Harrington).

Harrington does not disclose expressly that said plurality of dots includes a plurality of frequencies.

Tai discloses printing a plurality of dots including a plurality of frequencies (column 8, lines 24-31 of Tai).

Harrington and Tai are combinable because they are from the same field of endeavor, namely halftone image processing. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to use a plurality of frequencies for said plurality of dots, as taught by Tai. The motivation for doing so would have been that using different types of grayscale dot representations for specific regions (column 2, lines 46-51 of Tai) reduces the amount of image artifacts (column 2, lines 36-42 of Tai). Therefore, it would have been obvious to combine Tai with Harrington to obtain the invention as specified in claim 45.

Regarding claim 48: Harrington discloses a program product comprising a program (column 8, lines 35-38 of Harrington) configured to produce a plurality of dots on a recordable medium (column 4, lines 40-46 of Harrington); and a signal bearing medium bearing said program (column 8, lines 35-38 of Harrington).

Art Unit: 2624

Harrington does not disclose expressly that said plurality of dots includes multiple frequencies.

Tai discloses a plurality of dots including a multiple frequencies (column 8, lines 24-31 of Tai).

Harrington and Tai are combinable because they are from the same field of endeavor, namely halftone image processing. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to use multiple frequencies for said plurality of dots, as taught by Tai. The motivation for doing so would have been that using different types of grayscale dot representations for specific regions (column 2, lines 46-51 of Tai) reduces the amount of image artifacts (column 2, lines 36-42 of Tai). Therefore, it would have been obvious to combine Tai with Harrington to obtain the invention as specified in claim 48.

Regarding claim 49: Harrington discloses that said signal bearing medium includes at least one of a recordable medium and a transmission-type medium (column 8, lines 35-38 of Harrington). In order for software to be usable by a computer or workstation, software must be embodied on some form of recordable medium. Otherwise, it is not possible for the computer or workstation to read and execute the instructions in said software. Further, software must be transmittable from some type of physical storage drive to the CPU and RAM of the computer or workstation. Therefore, said signal bearing medium must inherently comprise some form of transmission type medium.

Regarding claims 60 and 68: Harrington discloses an apparatus (figure 1 of Harrington) which creates a threshold array (figure 3B and column 5, lines 36-39 of Harrington).

Art Unit: 2624

Harrington does not disclose expressly that said threshold array includes a gradual transition between highlights and shadows of said threshold array.

Tai discloses a gradual transition (column 9, lines 16-25 of Tai) between highlights and shadows (column 4, lines 30-40 of Tai). A gradually transitioning dot growth pattern is used in the apparatus of Tai (column 9, lines 16-25 of Tai), which produces a gradual transition between the highlights and shadows (column 4, lines 30-40 of Tai).

Harrington and Tai are combinable because they are from the same field of endeavor, namely halftone image processing. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to produce a gradual transition between highlights and shadows, as taught by Tai, in the threshold array taught by Harrington. The motivation for doing so would have been that producing a gradual transition between different image regions will better reproduce images with different regions (column 2, lines 46-51 of Tai) and reduce the overall level of image artifacts (column 2, lines 36-42 of Tai). Therefore, it would have been obvious to combine Tai with Harrington to obtain the invention as specified in claim 60.

Further regarding claim 61: Tai discloses that said program is further configured to gradually transition (figure 8 and column 9, lines 63-65 of Tai) between said multiple frequencies (column 8, lines 24-31 of Tai).

Regarding claims 62 and 69: Harrington discloses overlapping dots of said threshold array (figure 4B("CY" and "MC") and column 5, lines 46-49 of Harrington).

Regarding claim 64: Harrington discloses using said threshold array to generate a halftone image (column 5, lines 50-56 of Harrington).

Further regarding claim 71: Tai discloses creating a smooth transition between said plurality of dots (figure 2; column 3, lines 50-59; and column 10, lines 2-7 of Tai).

Regarding claim 75: Harrington discloses a program product comprising a program (column 8, lines 35-38 of Harrington) configured to produce a threshold array (figure 3b and column 5, lines 35-39 of Harrington); and a signal bearing medium bearing said program (column 8, lines 35-38 of Harrington).

Harrington does not disclose expressly that said threshold array includes a highlight and a shadow region, wherein the threshold array further includes a smooth transition between said highlight and said shadow region.

Tai discloses a smooth transition (column 9, lines 16-25 of Tai) between highlights and shadows (column 4, lines 30-40 of Tai). A smoothly transitioning dot growth pattern is used in the apparatus of Tai (column 9, lines 16-25 of Tai), which produces a smooth transition between the highlights and shadows (column 4, lines 30-40 of Tai).

Harrington and Tai are combinable because they are from the same field of endeavor, namely halftone image processing. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to produce a smooth transition between highlights and shadows, as taught by Tai, in the threshold array taught by Harrington. The motivation for doing so would have been that producing a gradual transition between different image regions will better reproduce images with different regions (column 2, lines 46-51 of Tai) and reduce

Art Unit: 2624

the overall level of image artifacts (column 2, lines 36-42 of Tai). Therefore, it would have been obvious to combine Tai with Harrington to obtain the invention as specified in claim 75.

Regarding claim 76: Harrington discloses that said signal bearing medium includes at least one of a recordable medium and a transmission-type medium (column 8, lines 35-38 of Harrington). In order for software to be usable by a computer or workstation, software must be embodied on some form of recordable medium. Otherwise, it is not possible for the computer or workstation to read and execute the instructions in said software. Further, software must be transmittable from some type of physical storage drive to the CPU and RAM of the computer or workstation. Therefore, said signal bearing medium must inherently comprise some form of transmission type medium.

20. Claims 33-37, 39-41, 50-52, 54-58 and 67 are rejected under 35 U.S.C. 103(a) as being unpatentable over Harrington (US Patent 5,631,748) in view of Delabastita (US Patent 5,828,463) and Tai (US Patent 5,729,632).

Regarding claims 33 and 67: Harrington discloses a method and apparatus for producing a halftone image (column 4, lines 35-39 of Harrington) using a program that executes on a processor (column 8, lines 35-38 of Harrington), comprising creating a halftone screen including dots that overlap (figure 4B("CY" and "MC") and column 5, lines 46-49 of Harrington).

Harrington does not disclose expressly specifically creating a printing plate including dots of different frequencies.

Art Unit: 2624

Delabastita discloses using a printing plate to form a halftone screen for printing a halftone image (column 6, lines 49-57 of Delabastita).

Harrington and Delabastita are combinable because they are from the same field of endeavor, namely halftone image processing. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to embody the halftone screen taught by Harrington on a printing plate, as taught by Delabastita. The suggestion for doing so would have been that a printing plate is one of the many old and well-known possible means available to one of ordinary skill in the art on which to form a halftone screen. Therefore, it would have been obvious to combine Delabastita with Harrington.

Harrington in view of Delabastita does not disclose expressly that said dots are of different frequencies.

Tai discloses halftoning with dots of different frequencies (figure 2; figure 3; and column 8, lines 23-31 of Tai).

Harrington in view of Delabastita is combinable with Tai because they are from the same field of endeavor, namely halftone image processing. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to use dots of different frequencies, as taught by Tai. The motivation for doing so would have been that using different types of grayscale dot representations for specific regions (column 2, lines 46-51 of Tai) reduces the amount of image artifacts (column 2, lines 36-42 of Tai). Therefore, it would have been obvious to combine Tai with Harrington in view of Delabastita to obtain the invention as specified in claims 33 and 67.

Art Unit: 2624

Further regarding claim 34: Tai discloses integrating fine and coarse frequency dots (column 10, lines 2-7 of Tai).

Regarding claims 35 and 40: Harrington discloses overlapping at least a portion of a first dot of a halftone cell of said printing plate with at least a portion of a second dot of said halftone cell (figure 4B("CY" and "MC") and column 5, lines 46-49 of Harrington). As can clearly be seen in figure 4B of Harrington, two locations in the halftone cell have overlapping dots (figure 4B("CY" and "MC") and column 5, lines 38-46 of Harrington), one location overlapping a cyan and a yellow dot (figure 4B("CY") of Harrington) and one location overlapping a magenta and a cyan dot (figure 4B("MC") of Harrington).

Regarding claims 36 and 41: Harrington discloses placing a first and a second dot within a halftone cell (figure 3 and column 5, lines 36-39 of Harrington).

As discussed above in the arguments regarding claims 33 and 67, said halftone cell would be embodied on the printing plate taught by Delabastita.

Harrington in view of Delabastita does not disclose expressly that said first and second halftone dots are dissimilar.

Tai discloses that said first and second halftone dots are dissimilar (figure 3 and column 8, lines 23-31 of Tai).

Harrington in view of Delabastita is combinable with Tai because they are from the same field of endeavor, namely halftone image processing. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to use dissimilar dots, as taught by Tai. The motivation for doing so would have been that using different types of grayscale

Art Unit: 2624

dot representations for specific regions (column 2, lines 46-51 of Tai) reduces the amount of image artifacts (column 2, lines 36-42 of Tai). Therefore, it would have been obvious to combine Tai with Harrington in view of Delabastita to obtain the invention as specified in claims 36 and 41.

Regarding claim 37: As discussed in the arguments regarding claims 33 and 67 above, which are incorporated herein, Harrington teaches creating a halftone screen including dots that overlap (figure 4B("CY" and "MC") and column 5, lines 46-49 of Harrington) and Tai teaches that said dots have different frequencies (figure 2; figure 3; and column 8, lines 23-31 of Tai).

Further regarding claims 39 and 52: Tai discloses that said dots, which are generated (column 8, lines 17-20 of Tai), include a frequency selected from a group consisting of at least one of a coarse pitch (column 8, lines 23-27 of Tai), a fine pitch (column 8, lines 26-31 of Tai), and an integrated pitch (blending of grayscale screen "1" and grayscale screen "2") (column 9, lines 61-65 of Tai).

Further regarding claim 50: Tai discloses that said integrating said fine and coarse frequency dots further includes generating a mid-tone dot (figure 2; column 3, lines 50-59 and column 10, lines 2-7 of Tai). For a grayscale level of 12 in the example of blending shown in Tai (column 10, lines 2-7 of Tai), a maximum dot size (figure 2(dot size 7) of Tai and a mid-tone dot size (figure 2(dot size 5) of Tai) would be used to generate the blending portion of screen "1" (column 3, lines 50-59 of Tai).

Further regarding claim 51: Tai discloses transitioning between said dots of different frequencies using a dot that

Art Unit: 2624

includes a third pitch (figure 2; column 3, lines 50-59; and column 10, lines 2-7 of Tai). For a grayscale level of 12 in the example of blending shown in Tai (column 10, lines 2-7 of Tai), a maximum dot size (figure 2(dot size 7) of Tai and a different frequency mid-tone dot size (figure 2(dot size 5) of Tai) would be used to generate the blending portion of screen "1" (column 3, lines 50-59 of Tai).

Further regarding claim 54: Tai discloses creating a smooth transition between said dots (figure 2; column 3, lines 50-59; and column 10, lines 2-7 of Tai).

Further regarding claim 55: Tai discloses a gradual transition between said dots having different frequencies (column 9, lines 63-65 of Tai).

Further regarding claims 56 and 57: Tai discloses a dot having a third frequency (figure 2 and column 3, lines 50-59 of Tai), wherein said dot having said third frequency is positioned between said dots having different frequencies (column 10, lines 2-7 of Tai). For a blended screen in the example (column 10, lines 2-7 of Tai), the dot having said third frequency, which is a mid-tone dot (figure 2 (dot size 5) of Tai), of screen "1" would be positioned between said dots having different frequencies as part of the halftone screen dot growth technique (column 3, lines 50-59 of Tai).

Regarding claim 58: As discussed above in the arguments regarding claims 33 and 67, which are incorporated herein, Harrington discloses a halftone screen (figure 4B of Harrington). Said halftone screen is associated with said printing plate (column 6, lines 49-57 of Delabastita).

21. Claims 53 and 59 are rejected under 35 U.S.C. 103(a) as being unpatentable over Harrington (US Patent 5,631,748) in view of Delabastita (US Patent 5,828,463), Tai (US Patent 5,729,632), and Kemmochi (US Patent 5,627,919).

Regarding claims 53 and 59: Harrington in view of Delabastita and Tai does not disclose expressly generating a cross shape.

Kemmochi discloses generating a cross dot shape (figure 1A; figure 5; column 4, lines 9-15 and column 6, lines 15-26 of Kemmochi).

Harrington in view of Delabastita and Tai is combinable with Kemmochi because they are from the same field of endeavor, namely halftone image processing. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to generate the cross dot shape taught by Kemmochi in the printing plate halftone screen taught by Harrington in view of Delabastita and Tai. The suggestion for doing so would have been that the cross halftone dot shape taught by Kemmochi is simply one more halftone dot shape that are possible for one of ordinary skill in the art to use when designing a halftone screen. Therefore, it would have been obvious to combine Kemmochi with Harrington in view of Delabastita and Tai to obtain the invention as specified in claims 53 and 59.

22. Claims 63 and 70 are rejected under 35 U.S.C. 103(a) as being unpatentable over Harrington (US Patent 5,631,748) in view of Tai (US Patent 5,729,632) and Curry (US Patent 5,696,604).

Regarding claims 63 and 70: Harrington discloses including within said threshold array a plurality of dots (figure 3 and column 5, lines 36-43 of Harrington) that include at least one

Art Unit: 2624

dissimilar characteristic selected from a group consisting of tone (column 4, lines 36-40 of Harrington) and orientation (figure 4 and column 5, lines 39-43 of Harrington). As is well known in the art, the different printing colors (cyan, magenta, yellow and black) (column 4, lines 36-40 of Harrington) each have different tone characteristics. Therefore, the dots can have different tone characteristics depending upon color conversion values (column 4, lines 53-57 of Harrington) and the results of under color removal (column 5, lines 16-21 of Harrington). Further, as shown in figures 4a and 4b of Harrington, and as is well-known to those of ordinary skill in the art, the color separation values (column 5, lines 39-43 of Harrington) are printed with different orientations depending upon the color to be printed (figure 4 of Harrington).

Harrington does not disclose expressly that said group consists not only of tone and orientation, as taught by Harrington, but also of frequency and shape.

Tai discloses that said plurality of dots can also be dissimilar in frequency (column 8, lines 24-31 and column 9, lines 61-65 of Tai).

Harrington and Tai are combinable because they are from the same field of endeavor, namely halftone image processing. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to use a plurality of dots having different frequencies, as taught by Tai. The motivation for doing so would have been that using different types of grayscale dot representations for specific regions (column 2, lines 46-51 of Tai) reduces the amount of image artifacts (column 2, lines 36-42 of Tai). Therefore, it would have been obvious to combine Tai with Harrington.

Art Unit: 2624

Harrington in view of Tai does not disclose expressly that said group consists not only of tone and orientation, as taught by Harrington, and of frequency, as taught by Tai, but also of shape.

Curry discloses that said plurality of dots can also be dissimilar in shape (column 5, lines 12-17 of Curry).

Harrington in view of Tai is combinable with Curry because they are from the same field of endeavor, namely halftone image processing. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to specifically have modifiable and thus differing dot shapes, as taught by Curry, thus making the group of dissimilar characteristics of said plurality of dots consist of frequency, as taught by Tai, shape, as taught by Curry, and tone and orientation, as taught by Harrington. The motivation for doing so would have been to more accurately adjust a halftone printing device, and thus automatically create more accurate halftone patterns (column 1, lines 55-63 of Curry). Therefore, it would have been obvious to combine Curry with Harrington in view of Delabastita to obtain the invention as specified in claims 63 and 70.

23. Claim 72 is rejected under 35 U.S.C. 103(a) as being unpatentable over Harrington (US Patent 5,631,748) in view of Tai (US Patent 5,729,632) and Delabastita (US Patent 5,828,463).

Regarding claim 72: Harrington discloses that said recording medium is one medium selected from a group consisting of a threshold array (figure 3b and column 5, lines 36-39 of Harrington) and a halftone screen (column 5, lines 36-39 and column 3, lines 5-8 of Harrington).

Art Unit: 2624

Harrington in view of Tai does not disclose expressly that said group consists not only of a threshold array and a halftone screen, as taught by Harrington, but also of a printing plate.

Delabastita discloses a printing plate as a recording medium (column 6, lines 49-57 of Delabastita).

Harrington in view of Tai is combinable with Delabastita because they are from the same field of endeavor, namely halftone image processing. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to use a printing plate, as taught by Delabastita. Said group would then consist of a threshold array and a halftone screen, as taught by Harrington, and a printing plate, as taught by Delabastita. The suggestion for doing so would have been that a printing plate is one of the many old and well-known possible means available to one of ordinary skill in the art on which to form a halftone screen. Therefore, it would have been obvious to combine Delabastita with Harrington in view of Tai to obtain the invention as specified in claim 72.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to James A Thompson whose telephone number is 571-272-7441. The examiner can normally be reached on 8:30AM-5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David K Moore can be reached on 571-272-7437. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Art Unit: 2624

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James A. Thompson
Examiner
Art Unit 2624

JAT
05 April 2005



THOMAS D.
~~THOMAS~~ LEE
PRIMARY EXAMINER